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ABSTRACT

A NSF- and NIH-sponsored survey of a sample of 5,000 Ph.D.'s in science and engineering was undertaken in 1973 and 1975 to obtain current data on their educational, employment, and career patterns. This report analyzes the employment situation by examining demographic and employment characteristics. Several employment categories are identified: unemployed and seeking employment; full-time employed in a nonscience or nonengineering position because employment in science or engineering was not available; and part-time employed in a science or engineering position, and seeking full-time employment. Individuals in these categories were studied by age, sex, field of Ph.D., year of Ph.D., primary work activity (excluding unemployed), and type of employer. (LBH)

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Employment Status of Ph.D. Scientists and Engineers 1973 and 1975

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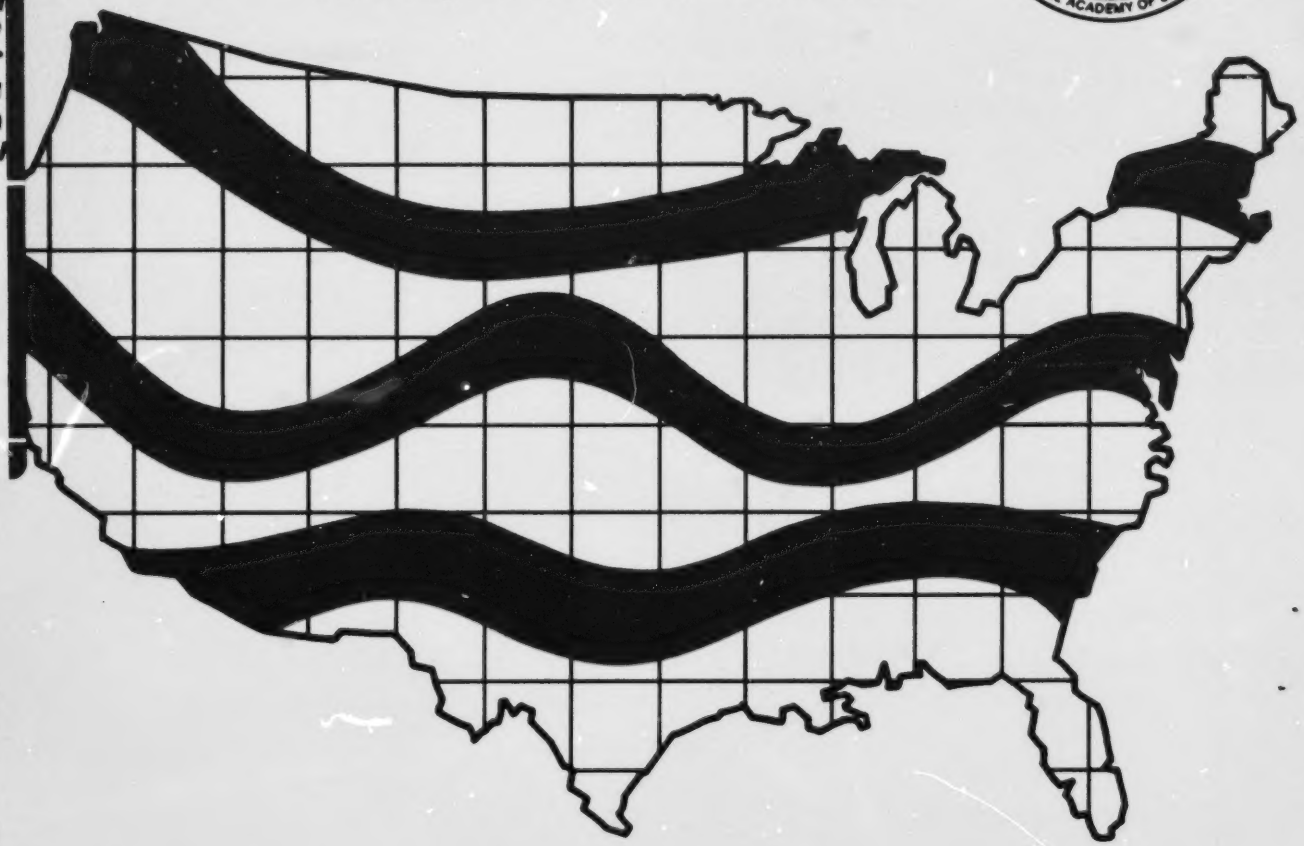

HE009458

Employment Status of Ph. D. Scientists and Engineers 1973 and 1975

This Report, prepared for the National Science Foundation, is based on the results of the 1973 and 1975 Survey of Doctoral Scientists and Engineers

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NATIONAL RESEARCH COUNCIL
NATIONAL ACADEMY OF SCIENCES

1976

NOTICE

This report is based on the 1973 and 1975 Survey of Doctoral Scientists and Engineers, a project approved by the Governing Board of the National Research Council, whose members are drawn from the Councils of the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine. The Survey project is part of the program of the Board on Human-Resource Data and Analyses.

A group other than the authors has reviewed this report in accordance with procedures approved by a Report Review Committee consisting of members of the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine.

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INTRODUCTION

In 1973 and 1975 the National Science Foundation and the National Institutes of Health sponsored a survey of a sample of Ph.D.'s in science and engineering to obtain current information on their educational, employment, and career patterns. These surveys, the first and second of a series of biennial surveys, were conducted by the Commission on Human Resources of the National Research Council-National Academy of Sciences. The statistics gathered from these surveys and presented in this report have been converted into population estimates; that is, each response was weighted so that the statistics represent, as nearly as possible, the results that would have been obtained if the entire population had been surveyed.[1]

The results of the 1973 survey indicated that as a percentage of the U.S. labor force, only 1.2 percent of the doctorates in science and engineering were unemployed and seeking work.[2] However, this relatively low unemployment rate did not fully explain the employment situation for this highly trained segment of the population. This report attempts to provide a more meaningful analysis of the employment situation by examining demographic and employment characteristics of these Ph.D.'s as they relate to employment status.

The individuals studied are the more than 5,000 doctoral scientists and engineers who indicated in the 1973 or 1975 Survey of Doctoral Scientists and Engineers that tney were in one of the following employment categories:

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[1] See Appendix A for a more detailed description of the 1973 and 1975 survey samples and response rates for each stratification criteria.

[2] Doctoral Scientists and Engineers in the United States: 1973 Profile. National Academy of Sciences, Washington, D.C., March 1974.

- Unemployed and seeking employment.
- Full-time employed in a nonscience or nonengineering position because employment in science or engineering was not available.
- Part-time employed in a science or engineering position, and seeking full-time employment.

Individuals in these employment categories were analyzed by age, sex, field of Ph.D.,[3] year of Ph.D., primary work activity (excludes unemployed), and type of employer (excludes unemployed).

The 1973 survey questionnaires were mailed during February-April of 1973. Those in the sample were asked to give their employment status as of the time the questionnaire was received. The employment data for the 1975 survey, however, were collected for a specific period, February 9-15, 1975. To place the findings of this report in perspective, it should be noted that the Bureau of Labor Statistics (BLS) of the U.S. Department of Labor reported national unemployment rates averaging 4.9 percent for the period February-April, 1973. In February 1975, BLS reported a national rate of 8.0 percent unemployment.

In both survey years, Ph.D.'s in science and engineering reported a lower unemployment rate than the national average. It should also be noted however that while national unemployment rates were higher in 1975, the reverse was true for Ph.D.'s in science and engineering where the 1975 unemployment rates were lower than the 1973 rates.

The statistics that follow are given as percentages of the estimated total labor force for Ph.D. scientists and engineers in the two survey years (229,392

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[3]The population of doctorate-holding scientists and engineers is defined as those with doctorates in the natural and social sciences, mathematics, and engineering. A detailed list of general fields of Ph.D. and fine fields within each general field is given in Appendix B as part of the 1973 and 1975 questionnaires.

in 1973 and 265,534 in 1975). Population estimates are based on the responses of 35,360 for the 1973 survey and 37,351 for the 1975 survey.[4] Results of the two surveys show that in 1973, approximately 1.2 percent (2,643) Ph.D.'s were unemployed and seeking work compared to approximately 1.0 percent (2,543) in 1975; in both survey years 0.3 percent (617 in 1973 and 815 in 1975) were full-time employed in nonscience/nonengineering because science/engineering positions were not available; and 0.9 percent (2,024) were working part-time while seeking full-time employment in 1973 compared to 0.7 percent (1,765) in 1975.

Variances have been calculated which take into account the sample design: stratified sampling with unequal allocation among strata. These sampling errors are presented in the analytical text as plus or minus (±) one standard deviation following the reported statistic.[5] The reader may construct whatever confidence interval is deemed appropriate for interpretation of the employment data. Because of the small numbers in certain subgroups discussed in this report, as well as the frequent occurrence of small proportions, caution should be exercised in the use of those statistics having a relatively large sampling error.

Samples were stratified by sex, Ph.D. field, year of doctorate, size of Ph.D. institution (for the 1973 survey sample), degree category (i.e., U.S. sciences/engineering, U.S. nonscience, foreign), and racial/ethnic identification (1975 survey sample) to insure more accurate estimates for subgroups and to minimize any potential bias due to insufficient coverage of the population.

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[4] The total sample of 59,086 in 1973 yielded responses from 44,017 doctoral scientists and engineers of which 35,360 were in the U.S. labor force; the 1975 sample of 66,779 yielded responses from 43,821 of which 37,351 were in the U.S. labor force.

[5] See Appendix C for explanation of sampling error.

One additional source of possible bias is survey nonresponse. Nonresponse is of particular concern when dealing with a sensitive and relatively small portion of the population such as those unemployed or those employed for reasons other than personal preference in part-time positions or jobs unrelated to their doctorate training. Although the effect of nonresponse bias on the data has not been addressed in this report, a study is planned for early 1977 to determine if such bias is present in the 1975 survey results. A sample of 1975 nonrespondents, including those for whom no valid address was available, will be surveyed to collect employment information. The results will be compared with those of the 1975 survey to determine if any significant differences exist between respondents and nonrespondents.

SUMMARY

- In both survey years, the unemployment rate for women was substantially higher than that for men (3.9 percent versus 0.9 percent in 1973 and 3.0 percent versus 0.8 percent in 1975).
- The percentage of women who were employed part-time and seeking full-time employment in 1975 was 2.4 percent as compared to 0.5 percent for men.
- Recent graduates (i.e., those surveyed within two years after the doctorate) generally had a higher rate of unemployment than other cohorts. This was especially true for women: 4.5 percent of the 1971-72 graduates were unemployed in 1973, while the 1973-74 graduates reported an unemployment rate of 3.1 percent in 1975.
- Unemployment rates of doctoral scientists and engineers decreased from 1.2 percent in 1973 to 1.0 percent in 1975. The most noticeable declines in unemployment figures occurred in the fields of mathematics, chemistry, and psychology.
- Chemistry and physics/astronomy Ph.D.'s experienced the highest rates of unemployment of all science and engineering fields in 1973; 1.7 percent and 1.5 percent respectively. In 1975 physics/astronomy reported the highest unemployment rate with 1.6 percent of the science and engineering doctoral labor force unemployed and seeking work.
- Certain subgroups reported high percentages in the categories part-time employed, seeking full-time employment and nonscience employed because a science position was not available. For women Ph.D.'s under 30 years of age, 5.4 percent in 1973 and 3.9 percent in 1975 were working

part-time and seeking full-time employment. For chemists employed in production, quality control, sales, or professional services, 3.9 percent in 1973 and 5.2 percent in 1975 were working in nonscience jobs.

EMPLOYMENT STATUS BY SEX AND FIELD OF DOCTORATE

Table I shows that female Ph.D.'s in physics/astronomy, although small in number, had unemployment rates as high as 6.8% ± 1.3% of the 453 women in the labor force in 1973 and 7.3% ±1.2% of a labor force of 546 in 1975. Furthermore, 8.4% ± 1.5% of female physicists/astronomers were working part-time in 1973 and seeking full-time employment while the figure in 1975 was 2.7% ± 0.8% It should be noted that two fields (physics/astronomy and earth sciences) showing declines in female part-time, seeking full-time employment also report higher unemployment rates. For chemistry, the level of unemployment for women changed from 6.5% ± 0.9% in 1973 to 3.7% ± 0.6% in 1975. This apparent decline in unemployment for women was reflected in the total rates for chemistry, a decrease from 1.7% ± 0.2% in 1973 to 1.0% ± 0.1% in 1975 (Figure 4). While unemployment rates for males showed little change in the majority of the doctoral fields from 1973 to 1975, women experienced changes in unemployment rates between the two survey years, particularly in the fields of chemistry and engineering.

Few differences were evident within fields between males and females who were employed full-time in a nonscience/nonengineering position. One exception worth noting occurred in 1973 for the field of engineering where 1.8% ± 0.9% of the women compared to only 0.2% ± 0.07% of the men indicated that they were working in nonscience jobs because science jobs were not available. The percentage of the labor force in this status also varied little between fields in both survey years and showed no statistically significant differences between 1973 and 1975. The percentage of female Ph.D.'s working part-time and seeking full-time employment was consistently higher than that for men in most fields

in both surveys. Percentages of female Ph.D.'s employed part-time decreased or held constant for all fields between 1973 and 1975, while during the same period the rate for male Ph.D.'s was unchanged.

TABLE I Employment Status by Field of Doctorate and Sex

Field of Doctorate	Labor Force		Employment Status+					
			Unemployed, Seeking Work		Full-Time Nonscience Employed Because Science Position Not Available		Part-Time Employed and Seeking Full-Time	
	Male	Female	Male	Female	Male	Female	Male	Female
All Fields#	N	N	%	%	%	%	%	%
1973	211,343	18,049	0.9	3.9	0.3	0.3	0.7	3.5
1975	242,346	23,188	0.8	3.0	0.3	0.4	0.5	2.4
Mathematics								
1973	12,132	777	1.4	1.9	0.2	.0	0.4	2.4
1975	14,400	979	0.5	1.9	0.4	0.5	0.6	2.2
Physics/Astronomy								
1973	20,878	453	1.4	6.8	0.6	.0	1.1	8.4
1975	23,494	546	1.5	7.3	0.6	0.9	0.8	2.7
Chemistry								
1973	34,838	1,837	1.4	6.5	0.5	0.2	0.8	3.9
1975	38,481	2,212	0.9	3.7	0.5	0.5	0.4	2.8
Earth Sciences								
1973	7,066	171	0.7	2.9	0.1	.0	0.6	9.4
1975	8,278	247	1.0	3.2	0.2	0.4	0.5	1.2
Engineering								
1973	33,872	114	0.8	6.1	0.2	1.8	0.5	4.4
1975	40,183	170	0.7	2.4	0.2	.0	0.3	0.6
Biosciences								
1973	50,594	6,071	0.6	4.5	0.2	0.5	0.5	3.2
1975	58,258	7,751	0.7	3.6	0.1	0.4	0.5	1.8
Psychology								
1973	18,262	4,417	0.7	3.1	0.1	0.2	0.4	3.8
1975	22,218	6,062	0.6	1.7	0.2	0.3	0.6	2.5
Social Sciences								
1973	26,704	3,053	0.7	2.8	0.3	0.3	0.9	3.3
1975	32,724	4,415	0.6	3.3	0.3	0.4	0.6	3.2
Nonsciences								
1973	6,851	1,131	0.7	2.6	.0	.0	0.5	1.9
1975	4,155	782	0.3	1.2	.0	.0	*	1.0

+Percentage of Labor Force in Survey Year
#Includes those not Reporting Field of Ph.D.
*Less Than 0.1%

EMPLOYMENT STATUS BY SEX AND AGE

When employment statistics for male and female Ph.D.'s were combined, the rate of unemployment was generally lower in 1975 for all Ph.D.'s (Figure 1). The percentages of Ph.D.'s working full-time in nonscience positions because of lack of positions in their fields were generally low and stable between the 1973 and 1975 surveys. Similarly, the percentage of part-time employees who were seeking full-time positions, although generally higher than the full-time nonscience rate, remained low in most age groups increasing somewhat for those under 30 or over 65. This part-time employment rate either declined slightly or remained the same between 1973 and 1975 for every age grouping. Clearer patterns emerged, however when separate statistics for males and females were compared (Table II).

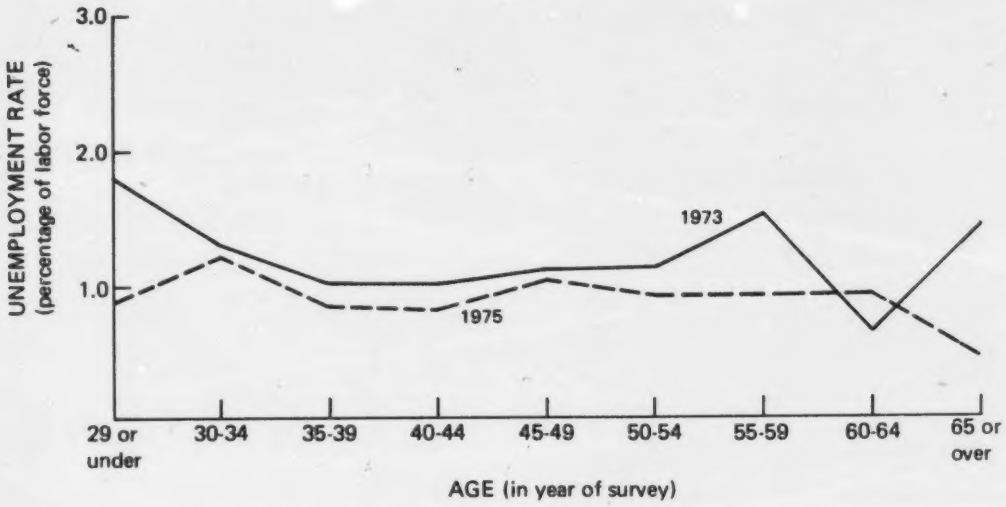


FIGURE 1 Unemployment Rates by Age for All Ph.D. Scientists and Engineers

Labor Force Estimates are provided in Appendix D.

Figure 2 and Table II show that the unemployment rates for female Ph.D. scientists and engineers were greater than those for male Ph.D.'s in virtually all age groups in 1973 and 1975. The trend lines for male Ph.D.'s vary little between age groups and resemble that in Figure 1. In comparison, the female trend lines show a downward slope as age increases.

TABLE II Employment Status by Age and Sex

Age in Survey Year	Labor Force		Employment Status[+]					
			Unemployed, Seeking Work		Full-Time Nonscience Employed Because Science Position Not Available		Part-Time Employed and Seeking Full-Time	
	Male	Female	Male	Female	Male	Female	Male	Female
Total[#]	N	N	%	%	%	%	%	%
1973	211,346	18,047	0.9	3.9	0.3	0.3	0.7	3.5
1975	242,346	23,188	0.8	3.0	0.3	0.4	0.5	2.4
29 or under								
1973	9,306	1,087	1.6	3.5	0.1	0.5	0.7	5.4
1975	8,246	1,602	0.6	2.6	0.3	.0	0.6	3.9
30–34								
1973	48,272	3,926	0.9	6.0	0.4	0.5	0.6	3.4
1975	51,816	5,283	0.9	4.6	0.5	0.5	0.6	2.3
35–39								
1973	41,192	2,952	0.8	4.3	0.2	0.3	0.6	5.4
1975	51,377	4,251	0.7	2.8	0.3	0.4	0.5	2.7
40–44								
1973	34,157	2,585	0.8	3.4	0.3	*	0.6	2.5
1975	38,824	2,905	0.7	3.2	0.2	0.8	0.2	2.7
45–49								
1973	28,162	2,628	0.9	3.4	0.2	0.4	0.4	3.7
1975	31,886	3,062	0.8	3.1	0.2	.0	0.5	2.1
50–54								
1973	22,719	1,877	0.9	3.6	0.2	0.3	0.8	3.3
1975	26,992	2,499	0.8	2.2	0.3	0.4	0.6	2.0
55–59								
1973	14,472	1,437	1.5	2.4	0.3	0.3	0.7	2.5
1975	17,342	1,521	0.8	2.1	0.2	0.2	0.6	2.6
60–64								
1973	8,083	824	0.6	1.1	0.2	.0	1.0	1.3
1975	10,296	1,197	0.9	1.0	0.2	1.0	0.4	1.4
65 or over								
1973	4,739	655	1.3	1.5	0.1	.0	1.8	2.0
1975	5,357	799	0.4	0.3	0.2	.0	0.9	0.6

[+]Percentage of Labor Force in Survey Year
[#]Includes those not Reporting Age
*Less than 0.1%

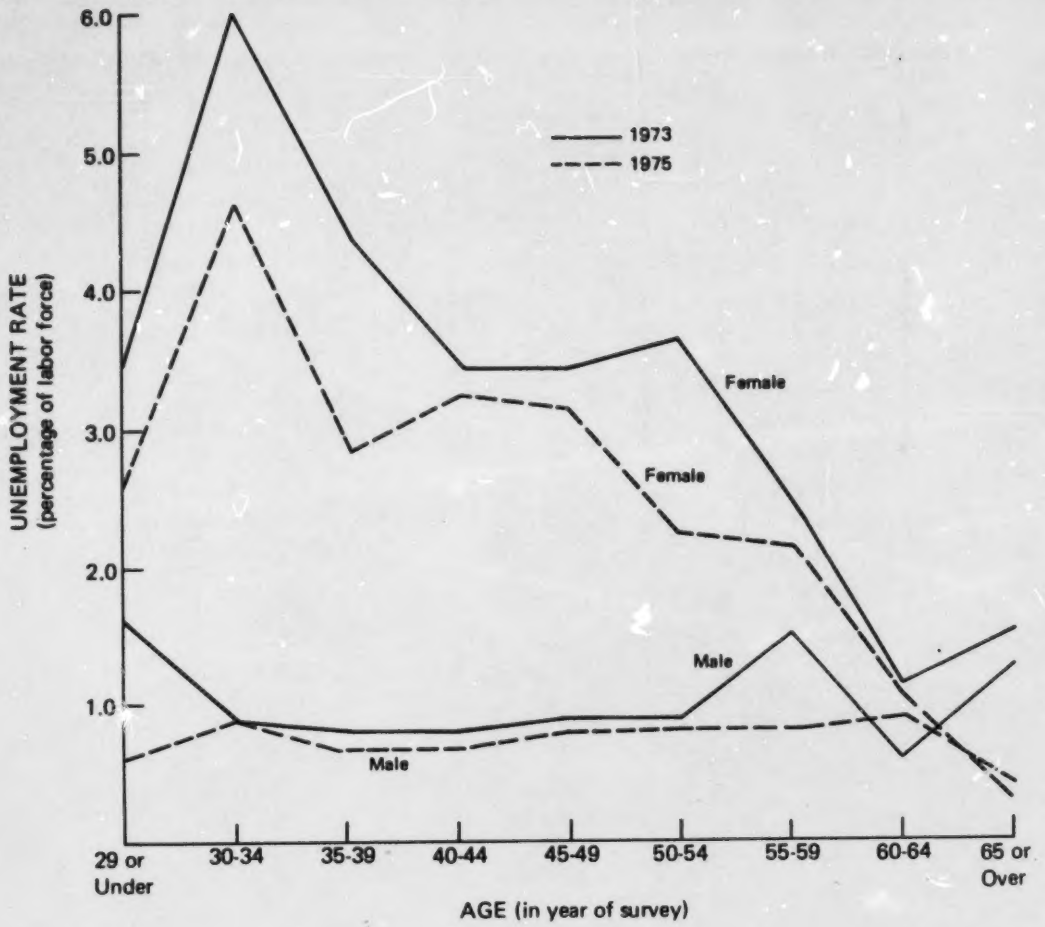


FIGURE 2 Unemployment Rates by Age for Male and Female Ph.D.'s

The percentage of the doctoral labor force employed full-time in nonscience/nonengineering because no science position was available was low for males and females in both 1973 and 1975 (Table II). A higher percentage of the labor force, however, reported working part-time but seeking full-time work in both survey years. The levels were especially high for young women, 5.4% $\pm$ 1.0% in 1973 and 3.9% $\pm$ 1.2% in 1975. Although the figures for Ph.D.'s in the part-time, seeking full-time employment status were generally lower for women in 1975

while the percentages for men were essentially unchanged, the rates for women in 1975 remained higher than those for men in nearly all age categories.

EMPLOYMENT STATUS BY SEX AND YEAR OF DOCTORATE

Unemployment rates for female Ph.D.'s were substantially higher than the rates for male doctoral scientists and engineers for nearly all years of doctorate (Figure 3). For each year of Ph.D. group, women consistently reported lower unemployment rates in 1975 compared to 1973. The statistics for men, however, indicated little change in unemployment between the two surveys.

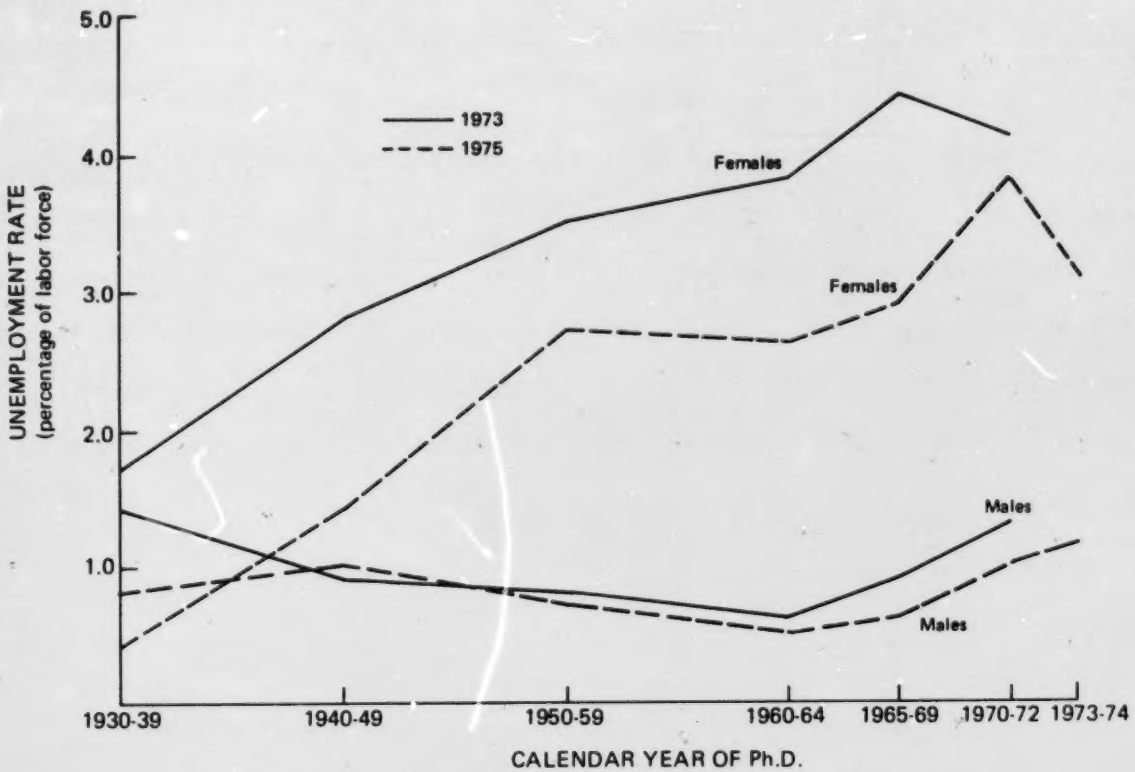


FIGURE 3 Unemployment Rates by Calendar Year of Ph.D. for Male and Female Ph.D.'s

Labor Force Estimates are provided in Appendix D.

For women, recent doctorate recipients (i.e., those surveyed one to two years after the doctorate) reported 3.1% ± 0.7% unemployment in 1975 compared to 4.5% ± 0.6% in 1973 (Table III). The percentage of women classifying themselves as part-time employees, seeking full-time work was 3.9% ± 0.6% of the 1973 labor force for 1971-72 graduates contrasted with 3.5% ± 0.7% for the 1973-74 graduates in 1975. The level of unemployment for recent male Ph.D.'s was 1.5% ± 0.2% for 1971-72 graduates in 1973 compared to 1.1% ± 0.2% for 1973-74 Ph.D. recipients in 1975. No significant changes occurred in the percentages of men holding part-time jobs, seeking full-time work or employed in a nonscience/nonengineering position.

In general, the percentage of Ph.D.'s working in nonscience or nonengineering jobs due to the lack of job opportunities in science and engineering was small and showed little variation by sex or year of Ph.D. In contrast, the percentage of women employed part-time, but seeking full-time work consistently exceeded the rate for men. It should be noted, however, that moderate to sharp declines in this employment status occurred for women between 1973 and 1975 for all calendar year groupings.

TABLE III Employment Status of Recent Ph.D.'s* by Year of Ph.D. and Sex

Survey Year	Year of Ph.D. and Sex	Labor Force	Employment Status+		
			Unemployed, Seeking Work	Full-Time Nonscience Employed Because Science Position Not Available	Part-Time Employed and Seeking Full-Time
		N	%	%	%
	1971-1972 Graduates				
1973	Men	25,013	1.5	0.4	1.0
	Women	2,956	4.5	0.1	3.9
	1973-1974 Graduates				
1975	Men	22,382	1.1	0.6	1.1
	Women	3,877	3.1	0.5	3.5

*Recent Ph.D.'s are defined as 1971-72 graduates for the 1973 survey and 1973-74 graduates for the 1975 survey.
+Percentage of Labor Force in survey year.

EMPLOYMENT STATUS BY FIELD AND YEAR OF DOCTORATE

In 1973, the fields with the highest unemployment rates for Ph.D.'s were chemistry (1.7% ± 0.2%) and physics/astronomy (1.5% ± 0.2%) (Figure 4). The physics/astronomy field also had a high percentage of part-time employees who were seeking full-time work in 1973 (1.3% ± 0.2%) as well as the highest unemployment rate of all science and engineering doctoral fields in 1975 (1.6% ± 0.2%).

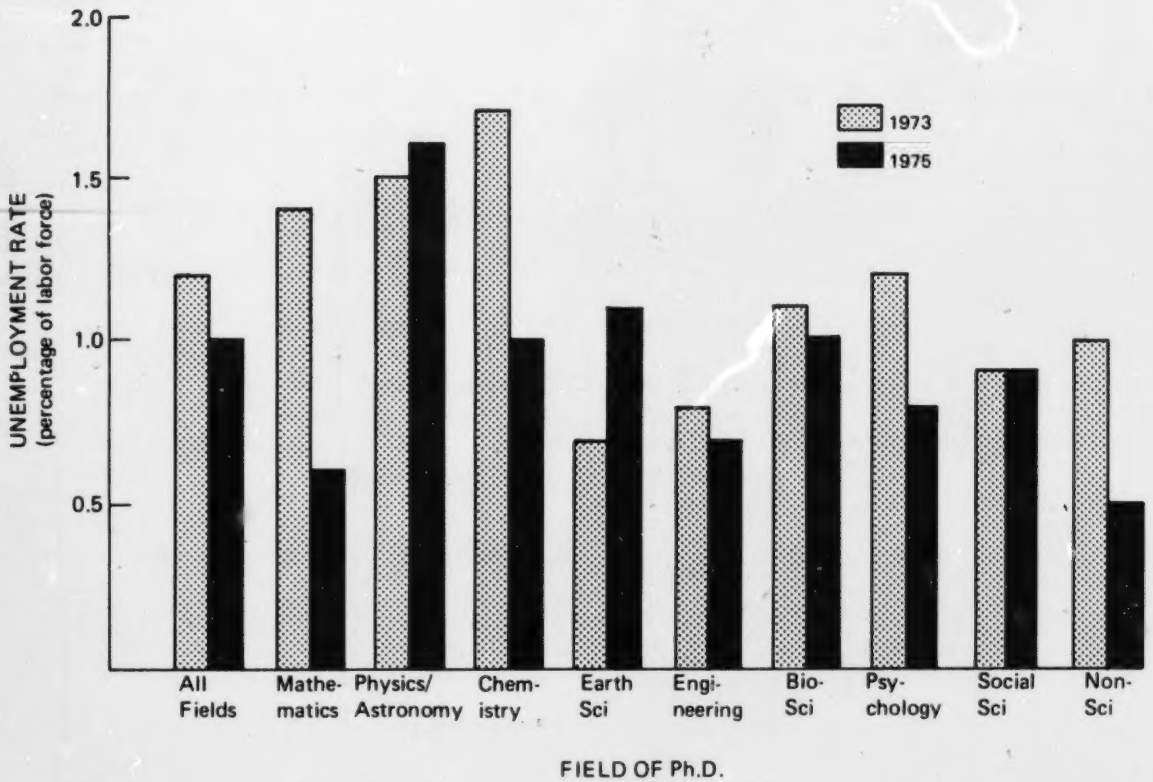


FIGURE 4 Unemployment Rates by Field of Doctorate for All Ph.D. Scientists and Engineers

Chemistry recovered in 1975 with a decline from 1.7% ± 0.2% in the rate of unemployment to 1.0% ± 0.1%. Mathematics also showed a decrease in unemployment between the two surveys with 1.4% ± 0.3% unemployed in 1973 compared to 0.6% ± 0.1% in 1975. Earth sciences, on the other hand, had a low unemployment rate in 1973 (0.7% ± 0.3%), yet reported a figure of 1.1% ± 0.3% of the labor force unemployed and seeking work in 1975.

Ph.D.'s in full-time nonscience or nonengineering employment because work in science or engineering was unavailable made up a small percentage of the labor force in all fields. No significant changes occurred in this employment status between the two surveys. Table IV shows the highest percentage was in the physics/astronomy field in 1975 where 0.6% ± 0.1% (147) of the labor force of 24,040 were working in full-time nonscience or nonengineering positions. In terms of absolute number, however, chemistry had the most with 222 nonscience, nonengineering Ph.D.'s in 1975. Part-time employees, seeking full-time positions in science or engineering were also few in number, although relatively high percentages of the labor force were reported in this status in the fields of physics/astronomy, psychology, and the social sciences. These rates were stable between 1973 and 1975.

A comparison of data for all science and engineering Ph.D.'s (Figure 4) with those for the recent doctorate recipients (1971-72 Ph.D.'s for the 1973 survey and 1973-74 Ph.D.'s for the 1975 survey) (Figure 5) reveals consistently higher unemployment rates for the latter in almost all science or engineering fields. Overall, recent recipients fared slightly better in 1975 with most fields showing lower or roughly equivalent unemployment rates compared to 1973.

TABLE IV Employment Status by Field of Ph.D. and Year of Ph.D.

			Employment Status[+]					
	Labor Force		Unemployed, Seeking Work		Full-Time Nonscience Employed Because Science Position Not Available		Part-Time Employed and Seeking Full-Time	
Field of Ph.D.	All Years of Ph.D.	Recent* Ph.D.'s	All Years of Ph.D.	Recent* Ph.D.'s	All Years of Ph.D.	Recent* Ph.D.'s	All Years of Ph.D.	Recent* of Ph.D.'s
All Fields[#]	N	N	%	%	%	%	%	%
1973	229,407	27,973	1.2	1.8	0.3	0.4	0.9	1.3
1975	265,534	26,259	1.0	1.4	0.3	0.6	0.7	1.4
Mathematics								
1973	12,910	1,906	1.4	1.7	0.2	.0	0.5	1.3
1975	15,379	1,723	0.6	0.4	0.4	1.3	0.7	2.0
Physics/Astronomy								
1973	21,332	2,417	1.5	2.8	0.5	1.0	1.3	2.9
1975	24,040	2,023	1.6	4.0	0.6	1.7	0.9	0.3
Chemistry								
1973	36,678	2,797	1.7	2.3	0.5	0.9	1.0	2.4
1975	40,693	2,482	1.0	1.4	0.5	1.0	0.6	1.0
Earth Sciences								
1973	7,236	982	0.7	3.0	0.1	0.3	0.8	1.6
1975	8,525	841	1.1	2.0	0.2	.0	0.6	2.6
Engineering								
1973	33,989	5,172	0.8	1.4	0.2	0.2	0.5	1.1
1975	40,353	4,205	0.7	1.1	0.2	.0	0.3	0.7
Biosciences								
1973	56,669	6,696	1.1	1.6	0.2	0.3	0.8	1.8
1975	66,009	6,364	1.0	1.3	0.2	0.1	0.6	1.1
Psychology								
1973	22,679	3,030	1.2	2.4	0.1	.0	1.1	1.0
1975	28,280	3,770	0.8	1.1	0.2	.0	1.0	2.1
Social Sciences								
1973	29,760	4,687	0.9	1.3	0.3	0.7	1.2	1.1
1975	37,137	4,851	0.9	1.2	0.3	1.2	0.9	2.2
Nonsciences								
1973	7,983	283	1.0	1.7	.0	.0	0.7	.0
1975	4,937	–	0.5	.0	.0	.0	0.2	.0

[+]Percentage of Labor Force in Survey Year
*Recent Ph.D.'s are defined as 1971-72 graduates for the 1973 survey and 1973-74 graduates for the 1975 survey
[#]Includes those not Reporting Field of Ph.D.

One possible area of increased unemployment, however, was the field of physics/astronomy where recent graduates reported 4.0% ± 1.3% unemployment in 1975 compared to 2.6% ± 1.0% in 1973. As in the total Ph.D. labor force those in nonscience or nonengineering jobs made up a very small percentage of the labor force of recent recipients, while the percentage of part-time employees, seeking full-time work ran as high as 2.9% ± 1.0% of the labor force in 1973 for physics/astronomy. This figure, however, dropped in 1975 to only 0.3% ± 0.3%.

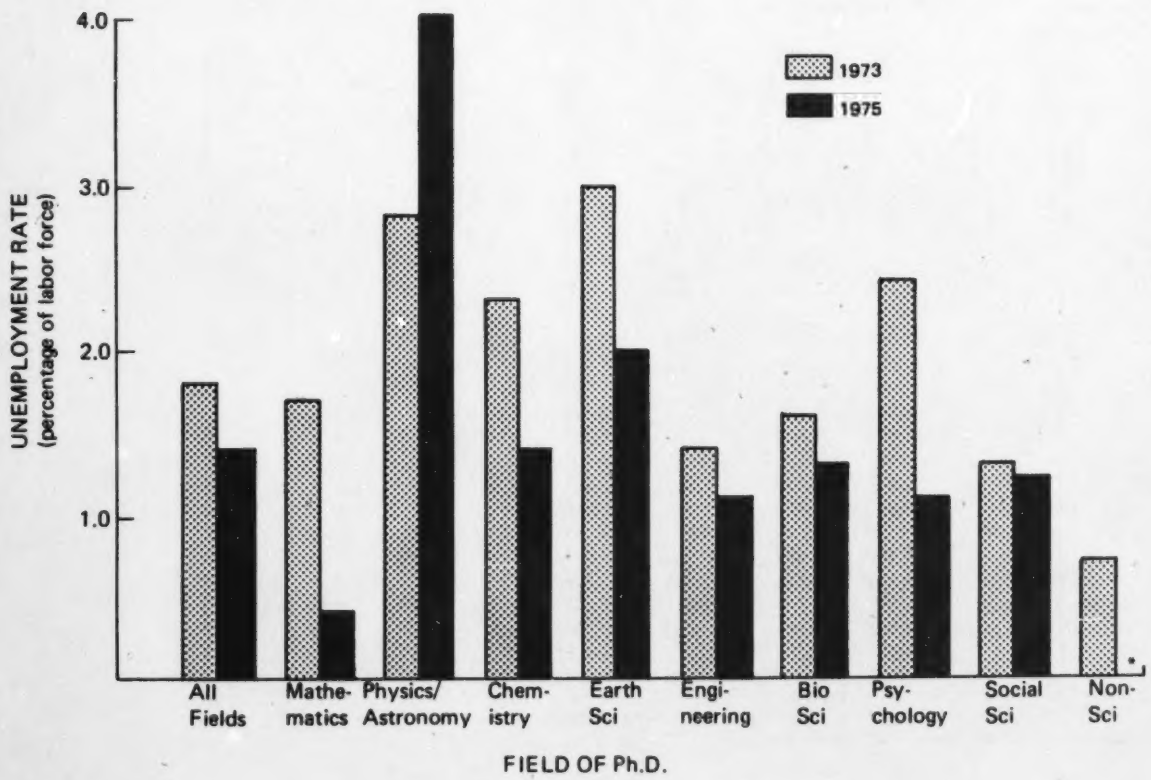


FIGURE 5 Unemployment Rates by Field of Doctorate for Recent Ph.D.'s+

+Recent Ph.D.'s are defined as 1971-72 graduates for the 1973 survey and 1973-74 graduates for the 1975 survey.
*No Nonscience Ph.D.'s in the 1973-74 sample

EMPLOYMENT STATUS BY TYPE OF EMPLOYER AND PRIMARY WORK ACTIVITY

Figures 6 and 7 present data for various primary work activity groups for Ph.D.'s employed in business or industry or in educational institutions. Analysis focuses on that portion of the primary work activity category either working in nonscience or nonengineering because science or engineering jobs were not available or employed part-time and seeking full-time work.

Figure 6 shows that among Ph.D.'s employed by business or industry, those working in the areas of production, quality control, sales or professional services had the largest percentage working full-time in nonscience and nonengineering positions in 1973(5.6% $\pm$ 0.8%). Among those who placed themselves in the "other" category for their primary work activity (including teaching) 5.0% $\pm$ 1.0% were working in nonscience jobs in 1973. Although lower percentages in the nonscience status were reported in 1975, rates in these two primary work activity groups remained higher than those in other categories.

The proportion of doctoral scientists and engineers in business or industry who classified themselves as part-time employees, seeking full-time work in 1973 was greatest for those Ph.D.'s engaged in report/technical writing or consulting (4.3% $\pm$ 0.6%). Between 1973 and 1975 the percentage of the labor force in the part-time employment status changed significantly only in the "other" primary work activity which includes teaching.

Excluding those in the "other" primary work activity category, Ph.D.'s employed by educational institutions generally reported low and stable percentages in the nonscience or nonengineering status (Figure 7). That segment of the academically employed in the part-time seeking full-time status comprised a small percentage of the labor force in most primary work activity

categories with the possible exception of production, quality control, sales and professional services.

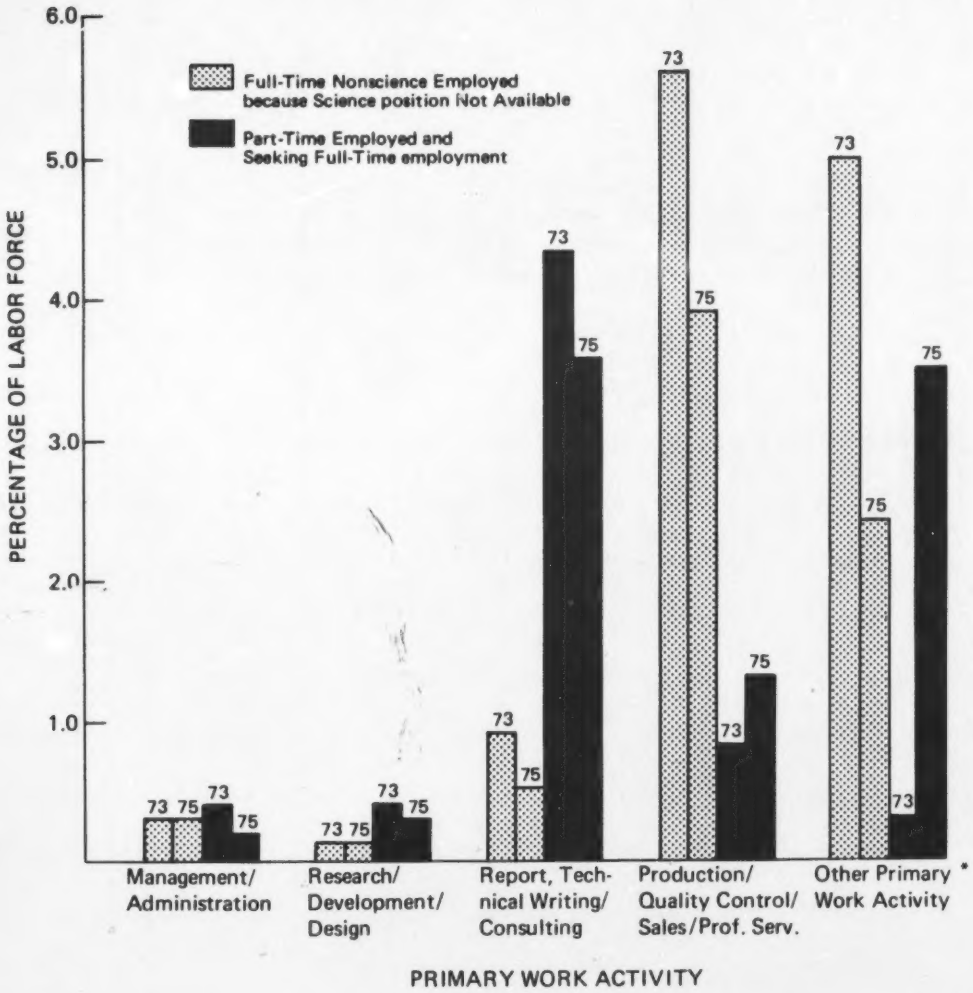


FIGURE 6 Selected Employment Status by Primary Work Activity for Ph.D.'s Employed in Business/Industry

*Includes Teaching

Labor Force Estimates are provided in Appendix D.

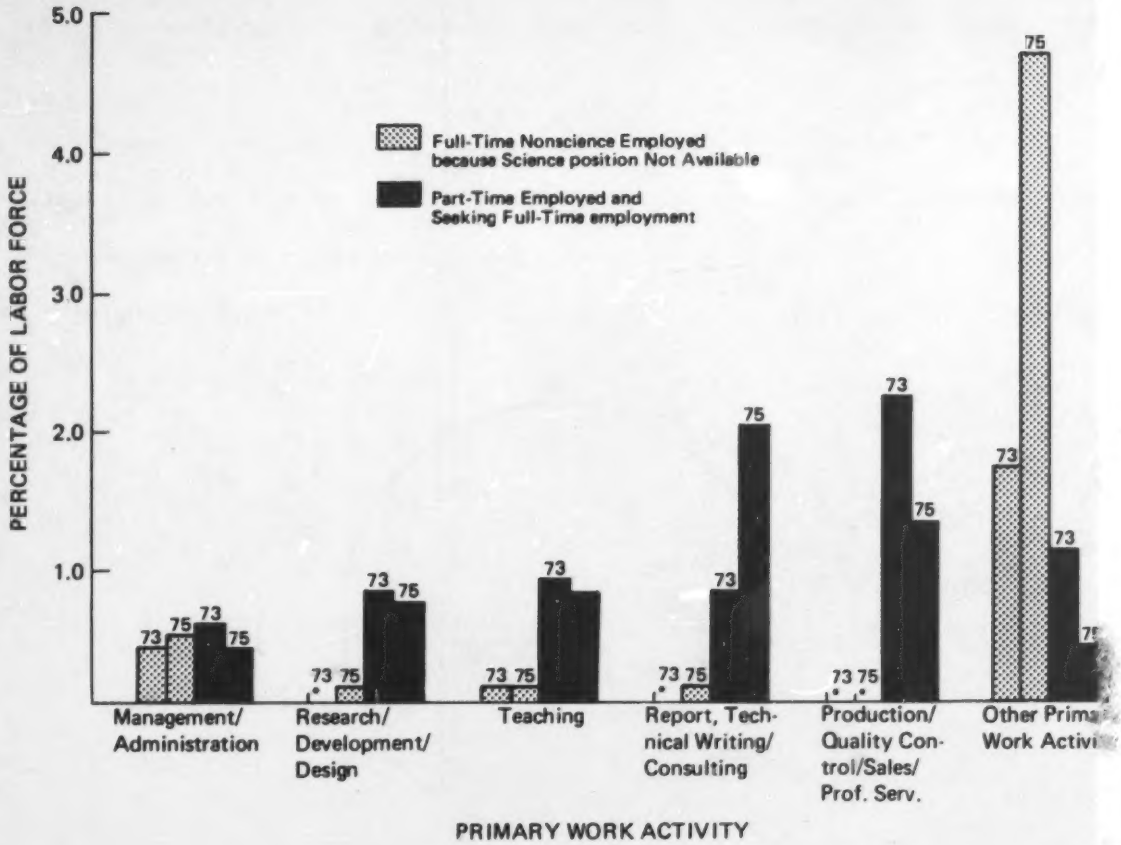


FIGURE 7 Selected Employment Status by Primary Work Activity for Ph.D.'s Employed in Educational Institu

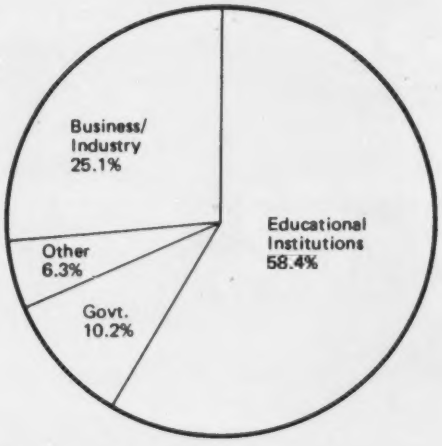
*None in Sample Reporting Status

Labor Force Estimates are provided in Appendix D.

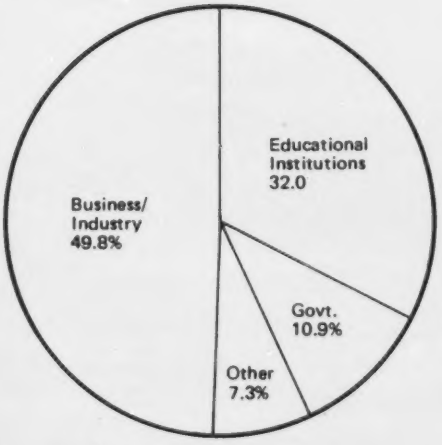
Figures 8a, 8b, and 8c examine the type of employer for the part-time and nonscience employed Ph.D.'s in relationship to the total [illegible] labor force. Changes from 1973 and 1975 were not significant; therefore, only 1975 data are presented. Figure 8a gives the employer type for the 262,991 doctoral scientists and engineers who were employed in 1975. While employing only 25.1% ± 0.2% of the total, business or industry employed half (49.8% ± 2.0%) of those working full-time in nonscience or nonengineering positions (Figure 8b). In

contrast, 58.4% ± 0.3% of the total employed worked for educational institutions compared to 32.0% ± 1.9% of the full-time nonscience Ph.D.'s.

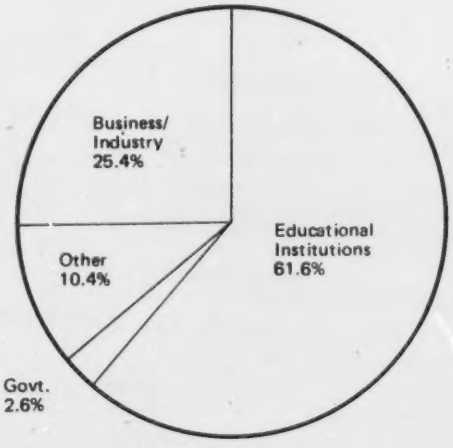
With the exception of government, the types of employers of those working part-time/seeking full-time employment and the total labor force do not differ greatly. Only 2.6% ± 0.6% of the part-time/seeking full-time group were employed by government, whereas 10.2% ± 0.2% of the total were so employed (Figure 8c).



a. Total Employed
(N=262,991)



b. Full-Time Nonscience Employed
Because Science Position Not Available
(N=815)



c. Part-Time Employed and Seeking
Full-Time Employment
(N=1,765)

FIGURE 8 Type of Employer by Employment Status, 1975

EMPLOYMENT STATUS BY FIELD OF DOCTORATE AND PRIMARY WORK ACTIVITY

Combining all doctorate fields and excluding the "other" primary work activity category, Ph.D.'s working in production, quality control, sales or professional services reported the highest percentage (1.7% ± 0.3% in 1973 and 1975) employed full-time in nonscience or nonengineering jobs because science/engineering positions were unavailable (Figure 9). Part-time employees who were seeking full-time positions were found most frequently in both survey years in jobs that involved report/technical writing or consulting. The rate in this primary work activity category changed from 4.5% ± 0.5% who were working part-time while seeking full-time employment in 1973 to 2.7% ± 0.5% in 1975. With the exception of the change which occurred in this category and status, no significant change took place between 1973 and 1975 in the rates of full-time nonscience and part-time employment.

Analysis of the breakdown of the two employment statuses by primary work activity reveals that management/administration and production, quality control, sales or professional services were the primary activities of 48.8% ± 2.0% of that part of the labor force working full-time in nonscience/nonengineering positions in 1973 and 53.4% ± 1.5% in 1975 (Table V). Of the 2,024 part-time employees who were seeking full-time work in 1973, more than one-third, 37.5% ± 1.3%, were engaged in teaching. In 1975 42.7% ± 1.5% of the 1,765 total were teaching. Research/development/design was the second most frequent work activity reported in both survey years, cited by 21.6% ± 1.1% in 1973 and 22.2% ± 1.8% in 1975 of those Ph.D.'s employed part-time.

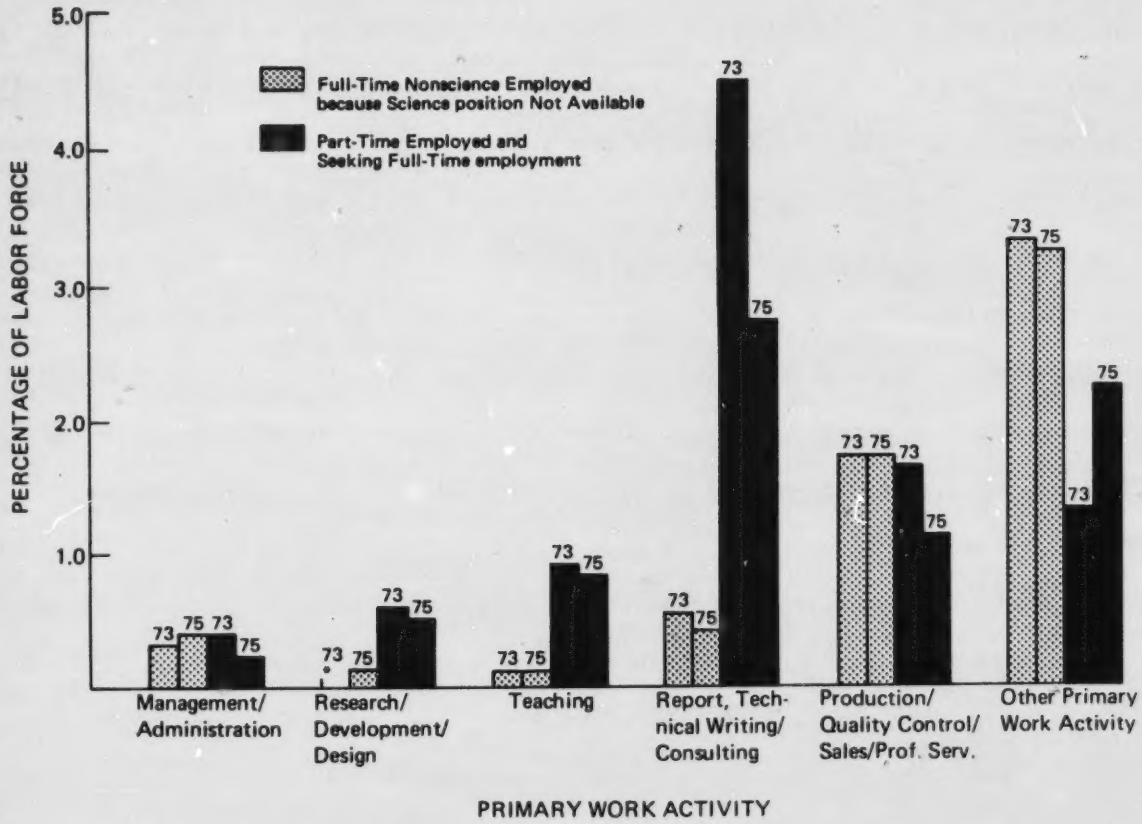


FIGURE 9 Selected Employment Status by Primary Work Activity for All Ph.D. Scientists and Engineers

*None in Sample Reporting this Status

Labor Force Estimates are provided in Appendix D.

TABLE V Primary Work Activity as a Percentage of Employment Status for all Ph.D.'s

	Employment Status[+]			
	Full-Time Nonscience Employed Because Science Position Not Available		Part-Time Employed and Seeking Full-Time	
Primary Work Activity	1973	1975	1973	1975
Total	N=621	N=815	N=2024	N=1765
	%	%	%	%
Management/Administration	21.7	24.3	8.3	6.8
Research/Development/Design	1.9	7.9	21.6	22.2
Teaching	11.4	13.4	37.5	42.7
Report, Technical Writing/Consulting	3.9	3.2	11.6	11.0
Production/Quality Control/Sales/ Professional Services	27.1	29.1	7.4	8.8
Other	23.2	16.2	2.8	5.2
No Report of Primary Activity	10.8	6.0	10.8	3.3

[+]Percentage of Total Reporting Status.

Following an examination of all Ph.D. fields, the fields of physics/astronomy and chemistry were singled out for more detailed analysis because of the high percentage who were part-time science employed or full-time nonscience employed in certain primary work activities (Table VI). Among all primary work activity groups, report/technical writing and consulting had the highest percentage of physics/astronomy Ph.D.'s working part-time and seeking full-time work in both survey years, with a 1975 figure of 10.4% $\pm$ 4.6%. Of those Ph.D. physicists working full-time in production, quality control, sales, professional services, 11.7% $\pm$ .0% in 1973 and 9.3% $\pm$ 2.6% in 1975 were doing so in a non-science capacity.

Table VI also shows that a similar pattern emerges for chemistry doctorates. Of those working primarily in writing/consulting, 9.8% $\pm$ 2.1% in 1973 and 4.9% $\pm$ 2.3% in 1975 were employed on a part-time basis. Among production, quality control, sales, or professional service workers, 3.9% $\pm$ 1.7% in 1973 and 5.2% $\pm$ 1.5% in 1975 claimed employment status in a nonscience or nonengineering position.

TABLE VI Employment Status by Primary Work Activity for Ph.D.'s in Physics/Astronomy and in Chemistry

Primary Work Activity	Labor Force		Employment Status[+]			
			Full-Time Nonscience Employed Because Science Position Not Available		Part-Time Employed and Seeking Full-Time	
	Physics/ Astronomy	Chemistry	Physics/ Astronomy	Chemistry	Physics/ Astronomy	Chemistry
Total[#]	N	N	%	%	%	%
1973	21,020	36,066	0.5	0.5	1.3	1.0
1975	23,659	40,272	0.6	0.5	0.9	0.6
Management/Administration						
1973	3,374	8,740	0.4	0.6	1.1	0.3
1975	4,234	11,115	0.9	0.7	0.5	0.2
Research/Development/Design						
1973	9,492	13,754	0.1	.0	0.8	0.5
1975	11,215	15,812	0.2	0.1	0.3	0.3
Teaching						
1973	6,323	8,710	0.3	0.1	1.4	1.2
1975	6,775	9,468	0.2	0.1	1.2	1.0
Report, Technical Writing/Consulting						
1973	341	717	.0	1.0	12.9	9.8
1975	298	775	2.7	1.5	10.4	4.9
Production/Quality Control/Sales/ Professional Services						
1973	171	1,099	11.7	3.9	1.2	1.5
1975	343	1,586	9.3	5.2	4.1	1.6
Other						
1973	305	755	13.8	6.5	1.3	4.2
1975	275	768	8.7	1.8	2.2	0.5

[+]Percentage of Labor Force in Survey Year.
[#]Includes Those Not Reporting Primary Work Activity.

APPENDIX A

POPULATION AND SAMPLING PROCEDURES

The 1973 Roster of Doctoral Scientists and Engineers, compiled by the National Research Council, contains data on 272,000 individuals who either recieved science or engineering doctorates in the period January 1930 through June 1972 or received doctorates in other fields within this time frame and were subsequently employed in science and engineering. A sample of 59,086 individuals was selected for the 1973 survey. This sample was stratified by year of doctorate, field of science or engineering, sex, size of doctoral institution (according to the number of science and engineering doctorates awarded), and degree category (i.e., U.S. science and engineering doctorates, U.S. nonscience doctorates, and foreign doctorates).

Prior to the 1975 Survey, the Roster was updated with data on the FY 1973-74 doctorate-recipients and additional information on scientists and engineers working in the U.S. who hold foreign doctorates. A stratified sample of these additions was selected according to year of doctorate, field of science or engineering, sex, racial/ethnic identification,[1] and degree category (i.e., U.S. science and engineering doctorates, U.S. nonscience doctorates, and foreign doctorates).

The 1975 Roster of Doctoral Scientists and Engineers thus includes data on 314,002 individuals who either received science or engineering doctorates in the period January 1930 through June 1974 or received doctorates in other fields within this time frame and were subsequently employed in science and

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[1] Racial/ethnic identification was first available for the FY 1973-74 recipients. The 1973 Survey results showed no substantive differences in employment data by size of doctoral institution. Therefore, this variable was dropped as a stratification criterion in 1975.

engineering. Approximately 88 percent of the 66,779 persons in the 1975 sample are also in the 1973 sample.

Variable sampling ratios were used so that the sample would accurately represent small groups within the population, such as older people, women, and graduates in less populous fields. The accompanying tables give 1973 and 1975 population, sample, and response figures for each of the stratification criteria.

POPULATION, SAMPLE AND SURVEY RESPONSE - 1973

1930-72 DOCTORAL SCIENTISTS AND ENGINEERS

	DOCTORAL ROSTER TOTAL* N	TOTAL SAMPLE N	RESPONSE RATES# (A) %	(B) %
TOTAL	272234	59086	74.5	79.0
FIELD OF PHD/EMPLOYMENT				
MATHEMATICS	15919	4409	73.7	77.1
PHYSICS/ASTRONOMY	24659	5139	73.5	77.7
CHEMISTRY	43113	7907	76.3	80.5
EARTH SCIENCES	8525	1986	79.5	83.4
ENGINEERING	38518	6362	74.3	78.4
BIOSCIENCES	68955	17091	75.2	80.8
PSYCHOLOGY	30983	7128	74.1	76.0
SOCIAL SCIENCES	40265	8142	71.9	75.9
NONSCIENCES/UNKNOWN	1297	922	72.5	80.7
YEAR OF PHD				
CY 1930-35	9927	2393	72.2	81.6
CY 1936-41	12259	2787	75.7	81.9
CY 1942-45	6501	1773	74.2	79.8
CY 1946-49	10088	2356	74.8	80.4
CY 1950-53	21770	4266	75.2	80.4
CY 1954-57	24920	4847	76.5	80.7
CY 1958-FY 61	26039	5733	73.9	77.2
FY 1962-63	17711	4695	74.1	77.7
FY 1964-65	22481	5488	73.1	77.7
FY 1966-67	27529	6244	73.7	78.2
FY 1968-69	33401	6978	72.0	76.9
FY 1970-71	39371	7481	75.8	79.3
FY 1972	19774	3699	80.6	82.8
UNKNOWN	465	346	54.9	64.2
CATEGORY OF PHD				
U.S. SCIENCE	252190	48870	74.6	78.6
U.S. NONSCIENCE	9669	5010	82.7	85.0
FOREIGN	10375	5206	66.0	76.8
SIZE OF PHD INSTITUTION+				
LESS THAN 50	15190	6615	74.7	78.5
50 TO 299	98404	18479	74.5	78.2
MORE THAN 299	138596	23776	74.6	79.0
UNCLASSIFIED	20044	10216	74.2	81.1
SEX				
MALE	248653	47675	74.8	79.2
FEMALE	23581	11411	73.0	78.3

*FIGURES INCLUDE THOSE DECEASED AND THOSE EMPLOYED IN FOREIGN COUNTRIES.

#BOTH RESPONSE RATES COMBINE THE NUMBER DECEASED WITH THE NUMBER OF VALID RESPONSES. RATE "A" IS CALCULATED ON THE TOTAL SAMPLE: RATE "B" IS CALCULATED ON ONLY THOSE CONTACTED.

+SIZE DETERMINED BY THE NUMBER OF DOCTORATES GRANTED BY AN INSTITUTION DURING A GIVEN TIME PERIOD (COHORT).

POPULATION, SAMPLE AND SURVEY RESPONSE - 1975

1930-74 DOCTORAL SCIENTISTS AND ENGINEERS

	DOCTORAL ROSTER TOTAL* N	TOTAL SAMPLE N	RESPONSE RATES# (A) %	(B) %
TOTAL	314002	66779	69.15	74.55
FIELD OF PHD/EMPLOYMENT				
MATHEMATICS	18646	5011	67.7	72.1
PHYSICS/ASTRONOMY	27936	5810	68.4	73.5
CHEMISTRY	47278	3821	70.6	76.6
EARTH SCIENCES	9758	2194	73.4	78.0
ENGINEERING	45228	7352	67.7	73.8
BIOSCIENCES	79409	19433	71.4	76.7
PSYCHOLOGY	36195	7910	68.8	74.1
SOCIAL SCIENCES	48276	9397	65.0	70.2
NONSCIENCES/UNKNOWN	1276	851	63.0	74.2
YEAR OF PHD				
CY 1930-35	10070	2386	67.07	75.62
CY 1936-41	12386	2782	71.42	76.96
CY 1942-45	6592	1773	72.90	77.71
CY 1946-49	10245	2351	72.50	77.58
CY 1950-53	22063	4256	71.96	77.07
CY 1954-57	25267	4839	73.01	76.82
CY 1958-FY 61	26416	5729	69.74	73.75
FY 1962-63	17943	4692	69.28	73.58
FY 1964-65	22654	5486	67.36	73.11
FY 1966-67	27667	6245	68.05	73.90
FY 1968-69	33587	6976	68.12	73.61
FY 1970-71	39541	7553	68.87	73.72
FY 1972	19827	3731	70.04	76.00
FY 1973-74	39053	7666	66.90	73.58
UNKNOWN	691	314	40.89	51.73
CATEGORY OF PHD				
U.S. SCIENCE	291397	56488	69.60	74.50
U.S. NONSCIENCE	10036	4965	74.29	77.89
FOREIGN	12569	5326	60.83	72.45
RACIAL/ETHNIC IDENTIFICATION				
PRE-FY1973-74 PHD+	274989	59148	69.47	74.69
WHITE/CAUCASIAN	26469	3492	76.39	81.06
ORIENTAL	3341	1381	54.27	60.89
OTHER MINORITIES	1087	842	62.30	67.96
UNKNOWN	8116	1916	60.53	70.39
SEX				
MALE	284721	53352	69.38	74.59
FEMALE	29281	13427	68.26	74.36

*FIGURES INCLUDE THOSE DECEASED AND THOSE EMPLOYED IN FOREIGN COUNTRIES.

#RATE "A" IS THE NUMBER OF 1975 SURVEY RESPONSES DIVIDED BY THE TOTAL SAMPLE MINUS "INACTIVE" SAMPLE MEMBERS. THE "INACTIVE" SAMPLE INCLUDES PERSONS KNOWN DECEASED PRIOR TO THE 1975 SURVEY, AND INDIVIDUALS WHO RESPONDED IN 1973 THAT THEY WERE OUTSIDE OF THE SCOPE OF THE SURVEY. RATE "B" IS THE NUMBER OF 1975 SURVEY RESPONSES DIVIDED BY THE TOTAL SAMPLE MINUS THOSE "INACTIVE" AND THOSE NOT CONTACTED.

+RACIAL/ETHNIC DATA IS NOT AVAILABLE FOR THOSE PRE-FY 1973-74 PHD RECIPIENTS.

APPENDIX B

QUESTIONNAIRES AND SPECIALTIES LISTS

1973 AND 1975 SURVEY OF DOCTORAL SCIENTISTS AND ENGINEERS

SURVEY OF DOCTORAL SCIENTISTS AND ENGINEERS

OMB No. 99-S73001
Approval expires Dec. 31, 1975

CONDUCTED BY THE NATIONAL RESEARCH COUNCIL WITH THE SUPPORT OF THE NATIONAL SCIENCE FOUNDATION.

The letter on the adjacent page requests that you assist in this survey of doctoral scientists and engineers – including the fields of the natural and social sciences, mathematics, and engineering.

Please print or type your answers on this first page. If selected information has been printed by computer, check to be certain the entries are CORRECT and COMPLETE. The second page has special instructions. After the form has been completed, please return it in the enclosed envelope to: Manpower Studies Branch, Office of Scientific Personnel, National Research Council, 2101 Constitution Avenue, Washington, D. C. 20418.

NOTE: ALL INFORMATION IS REGARDED AS CONFIDENTIAL AND WILL BE USED FOR STATISTICAL PURPOSES ONLY. IT WILL NOT BE RELEASED IN ANY WAY THAT WILL ALLOW IT TO BE IDENTIFIED WITH YOU.

If your name and address are incorrect, please enter correct information to the right. Include zip code.

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(10)

(2-9)

If there is an alternate address through which you could be reached, please provide it in the space below.

C/O Number Street City State Zip Code (11)

VITA

1. **Date of Birth** (12-16) Mo. Day Yr.
2. **State or Foreign Country of Birth** (17-18)
3. **State or Foreign Country of Secondary School Graduation** (19-20)
4. **Sex:** (21) ☐ 1- Male ☐ 2- Female
5. **Citizenship:** (22) ☐ 0- USA ☐ 1- Non-USA (specify country) _____
6. **Social Security No.** (23-31)
7. **Race:** (32) (Please check one) ☐ 0- White/Caucasian ☐ 1- Black/Negro ☐ 2- American Indian ☐ 3- Asian, specify _____ ☐ 4- Other, specify _____
8. **Ethnic Group:** (33) (Please check one) ☐ 0- Puerto Rican American ☐ 1- Mexican American/Chicano ☐ 2- Spanish American ☐ 3- Afro-American ☐ 4- None of these. (Please specify any other) _____
9. List in the table below all collegiate and graduate degrees that have been awarded to you, e.g., BA/BS, MA/MS, PhD. If some information has been entered by computer, please be sure it is CORRECT and COMPLETE (including the number and name of the specialty field from the list on the reverse side).

Type of Degree	Granted Mo.	Granted Yr.	Major Field (Use Specialties List) Name	Major Field (Use Specialties List) Number	Institution Name	City (or campus) and State
BS						
MS						
PhD						
.....						

10. **Name of your doctoral thesis advisor:** (23-44)
(please print FULL name) (First Name) (Middle Initial) (Last Name)

PROFESSIONAL EMPLOYMENT

11. **Please give the name of your present principal employer (organization, company, etc. or, if self-employed, "self"), and actual place of employment.**

Name of present principal employer (45-50) Actual place of employment (city, state and zip code) (51-55)

If employed by a university, college, or junior college, please check the rank of your present position: (56)

☐ 0- Professor ☐ 1- Associate Professor ☐ 2- Assistant Professor ☐ 3- Instructor ☐ 4- Lecturer ☐ 5- Other, specify _____

12. **Please give the basic annual salary associated with your principal professional employment in 1972 and 1973. If you were on a postdoctoral appointment (e.g., fellowship, traineeship, research associateship) give your annual stipend plus allowances below.**

1972 - $ _____ (57-59) 1973 - $ _____ (60-62)

If academically employed, check whether salary is for:

	1972	1973
9-10 mos.	☐	☐
11-12 mos.	☐	☐
	(63)	(64)

(Basic Annual Salary is your annual salary before deductions for income tax, social security, retirement, etc., but does not include bonuses, overtime, summer teaching, or other payment for professional work.)

PLEASE CONTINUE ▶

Please Do Not Write In This Space

1 1 2-9 ctr #
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63 64

PLEASE READ DIRECTIONS ON ADJACENT PAGE.

13. What is your employment status? (1972 / 1973)

- Employed full-time, science or engineering related position ○ ○
- Employed full-time, nonscience or nonengineering related position (Complete 13a below) ○ ○
- Employed part-time, science or engineering related position (Complete 13b below) ○ ○
- Employed part-time, nonscience or nonengineering related position (Complete 13b below) ○ ○
- Postdoctoral appointment (fellowship, traineeship, research associateship, etc.) Complete 13c below ○ ○
- Unemployed and seeking employment ○ ○
  - Specify number of months unemployed: __ __
- Unemployed and not seeking employment ○ ○
- Retired and not seeking employment ○ ○
  - Specify year of retirement: __ __
- Other, specify _____ ○ ○

13a. If you are employed full-time in 1973 in a position unrelated to science or engineering, what was the MOST important reason for taking the position? (1973)

- Prefer nonscience or nonengineering position ○
- Promoted out of science or engineering position ○
- Pay is better ○
- Locational preference ○
- Science or engineering position not available ○
- Other, specify _____ ○

13b. If employed part-time in 1973, are you seeking full-time employment? (1973)

- Yes ○
- No ○

13c. If on postdoctoral appointment in 1973, what was the MOST important reason for taking the appointment? (1973)

- Sought additional research experience in field ○
- Opportunity to change to another field ○
- Employment position not available ○
- Other, specify _____ ○

14. If employed or on a postdoctoral appointment in 1973, please indicate the term of employment or appointment: (1973)

- Three months or less ○
- More than 3 months, not more than one year ○
- More than one year, not more than 3 years ○
- More than 3 years, not more than 5 years ○
- Permanent or tenured position ○

15. Which categories best describe the sector of the economy and type of organization of your principal employer or postdoctoral affiliation? (1972 / 1973)

A. **Sector:**
- Public ○ ○
- Private ○ ○

B. **Type of organization:**
- Business or industry ○ ○
- Junior college, 2-year college, technical institute ○ ○
- Medical school ○ ○
- 4-year college or university, other than medical school ○ ○
- Elementary or secondary school system ○ ○
- Hospital or clinic ○ ○
- U.S. military service, active duty, or Commission Corps., e.g., USPHS, NOAA ○ ○
- U.S. government, civilian employee ○ ○
- State government ○ ○
- Local or other government, specify _____ ○ ○
- International agency ○ ○
- Non-profit organization, other than hospital, clinic, or educational institution ○ ○
- Other, specify _____ ○ ○

16. What are the primary (A) and secondary (B) work activities related to your position?

	1972 A	1972 B	1973 A	1973 B
Management or administration of:				
Research and development	○	○	○	○
Other than research and development	○	○	○	○
Both	○	○	○	○
Basic research	○	○	○	○
Applied research	○	○	○	○
Development of equipment, products, systems, data	○	○	○	○
Design	○	○	○	○
Teaching	○	○	○	○
Report or other technical writing, editing	○	○	○	○
Production	○	○	○	○
Consulting, specify _____	○	○	○	○
Professional services to individuals	○	○	○	○
Quality control, inspection, testing	○	○	○	○
Sales, marketing, purchasing, estimating	○	○	○	○
Other, specify _____	○	○	○	○

17. From the specialties list on the adjacent page, select and enter both the number and title of the scientific specialty most closely related to your principal employment or postdoctoral appointment. Write in your specialty if it is not on the list.

1972 [ ][ ][ ] Number _____

1973 [ ][ ][ ] Number _____

18. Is ANY of your work being supported or sponsored by U.S. government funds?

	Yes	No	Don't Know
1972	○	○	○
1973	○	○	○

If yes, which of the following federal agencies or departments are supporting the work? (Mark all that apply.)

	1972	1973		1972	1973
NASA	○	○	Dept. of Defense	○	○
NSF	○	○	Dept. of Commerce	○	○
EPA	○	○	Dept. of Agriculture	○	○
AEC	○	○	Dept. of Transportation	○	○
AID	○	○	Dept. of Justice	○	○
Dept. of Health, Educ., & Welfare			Dept. of Housing and Urban Development	○	○
NIH	○	○	Dept. of Interior	○	○
Health Services & Mental Health Admin.	○	○	Other agency or dept., specify _____	○	○
Office of Educ.	○	○			
Other HEW, specify _____	○	○	Don't know source	○	○

This is the end of the questionnaire. Thank you.

Please Do Not Write in This Space

DIRECTIONS: Your responses to this portion of the questionnaire will be read by an optical mark reader. Your careful observance of these few simple rules will be most appreciated.

- Use only black lead pencil (No. 2½ or less).
- Make heavy black marks that fill the circle.
- Erase cleanly any answer you wish to change.
- Make no stray markings of any kind.

EXAMPLE:

	Yes	No
Will marks made with ball pen, felt tip, or fountain pen be properly read?	○	●

PLEASE NOTE that we are requesting that you furnish the following information for both the current year, as of the time you receive this form, and last year, as of March 31, 1972. Fill in the category of each item which most appropriately describes your status in 1972 and 1973. Unless otherwise specified, mark only one category in each year.

SPECIALTIES LIST

MATHEMATICAL SCIENCES

000 · Algebra
010 · Analysis & Functional Analysis
020 · Geometry
030 · Logic
040 · Number Theory
052 · Probability
055 · Math, Statistics (see also 544, 670, 725, 729)
060 · Topology
080 · Computing Theory & Practice
082 · Operations Research (see also 477)
085 · Applied Mathematics
089 · Combinatorics & Finite Mathematics
091 · Physical Mathematics
098 · Mathematics, General
099 · Mathematics, Other*

ASTRONOMY

101 · Astronomy
102 · Astrophysics

PHYSICS

110 · Atomic & Molecular Physics
120 · Electromagnetism
130 · Mechanics
132 · Acoustics
134 · Fluids
135 · Plasma Physics
136 · Optics
138 · Thermal Physics
140 · Elementary Particles
150 · Nuclear Structure
160 · Solid State
198 · Physics, General
199 · Physics, Other*

CHEMISTRY

List A

Fields used to classify academic degrees. Use for Item 9 on questionnaire. Also see note below.

200 · Analytical
210 · Inorganic
220 · Organic
230 · Nuclear
240 · Physical
250 · Theoretical
260 · Agricultural & Food
270 · Pharmaceutical
298 · Chemistry, General
299 · Chemistry, Other*

List B

Fields used to classify present professional employment. Use for Item 17 on questionnaire. Also see note below for the doctoral field in Item 9.

205 · Analytical Chemistry
215 · Synthetic Organic & Organometallic Chemistry
225 · Synthetic, Inorganic & Natural Products
235 · Nuclear Chemistry
245 · Quantum Chemistry
255 · Structural Chemistry
265 · Thermodynamics & Material Properties
275 · Polymers
285 · Chemical Dynamics

NOTE: Please use List B fields to classify your doctoral degree in Item 9. This is a classification which is requested in addition to the field chosen from List A. Print the List B field beside the doctoral code number from List A.

EARTH, ENVIRONMENTAL & MARINE SCIENCES

301 · Mineralogy, Petrology
305 · Geochemistry
310 · Stratigraphy, Sedimentation
320 · Paleontology
330 · Structural Geology
340 · Geophysics (Solid Earth & Atmospheric)
350 · Geomorph., Glacial Geology
360 · Hydrology
370 · Oceanography
380 · Meteorology
388 · Environmental Sciences, General
389 · Environmental Sciences, Other*
391 · Applied Geology, Geol. Engr., Econ. Geol.
397 · Marine Sciences, Other*
398 · Earth Sciences, General
399 · Earth Sciences, Other*

ENGINEERING

400 · Aeronautical & Astronautical
410 · Agricultural
415 · Biomedical
420 · Civil
430 · Chemical
435 · Ceramic
440 · Electrical
445 · Electronics
450 · Industrial, Manufacturing
455 · Nuclear
460 · Engineering Mechanics
465 · Engineering Physics
470 · Mechanical
475 · Metallurgy & Phys. Met. Engr.
477 · Operations Research, Systems (see also 082)
479 · Fuel Technology, Petrol Engr.
480 · Sanitary/Environmental
486 · Mining
497 · Materials Science Engr.
498 · Engineering, General
499 · Engineering, Other*

AGRICULTURAL SCIENCES

500 · Agronomy
501 · Agricultural Economics
502 · Animal Husbandry
504 · Fish & Wildlife
505 · Forestry
506 · Horticulture
507 · Soils & Soil Science
510 · Animal Sciences
511 · Phytopathology
517 · Food Science & Technology (see also 573)
518 · Agriculture, General
519 · Agriculture, Other*

MEDICAL SCIENCES

520 · Medicine & Surgery
522 · Public Health
523 · Veterinary Medicine
524 · Hospital Administration
527 · Parasitology
534 · Pathology
536 · Pharmacology
537 · Pharmacy
538 · Medical Sciences, General
539 · Medical Sciences, Other*

BIOLOGICAL SCIENCES

540 · Biochemistry
542 · Biophysics
543 · Biomathematics
544 · Biometrics, Biostatistics (see also 055, 670, 725, 729)
545 · Anatomy
546 · Cytology
547 · Embryology
548 · Immunology
550 · Botany
560 · Ecology
562 · Hydrobiology
564 · Microbiology & Bacteriology
566 · Physiology, Animal
567 · Physiology, Plant
569 · Zoology
570 · Genetics
571 · Entomology
572 · Molecular Biology
573 · Food Science & Technology (see also 517)
574 · Behavior/Ethology
578 · Biological Sciences, General
579 · Biological Sciences, Other*

PSYCHOLOGY

600 · Clinical
610 · Counseling & Guid
620 · Developmental &
630 · Educational
635 · School Psychology
641 · Experimental
642 · Comparative
643 · Physiological
650 · Industrial & Person
660 · Personality
670 · Psychometrics (see also 055, 5
680 · Social
698 · Psychology, Genera
699 · Psychology, Other*

SOCIAL SCIENCES

700 · Anthropology
703 · Archeology
708 · Communications*
709 · Linguistics
710 · Sociology
720 · Economics (see als
725 · Econometrics (see also 055, 5
729 · Social Statistics (see also 055, 5
740 · Geography
745 · Area Studies*
750 · Political Science, P
755 · International Relat
770 · Urban & Reg. Plan
775 · History & Phil. of S
798 · Social Sciences, Ge
799 · Social Sciences, Oth

ARTS & HUMANI

841 · Fine & Applied Arts Music, Speech,
842 · History
843 · Philosophy, Religio
845 · Languages & Litera
846 · Other Arts and Hu

EDUCATION & O PROFESSIONAL

938 · Education

882 · Business Administr
883 · Home Economics
884 · Journalism
885 · Speech and Hearin
886 · Law, Jurisprudence
887 · Social Work
891 · Library & Archival
898 · Professional Field,

899 · OTHER FIELDS*

* Identify the specific field in the space provided on the

1975 SURVEY OF DOCTORAL SCIENTISTS AND ENGINEERS

OMB No. 000-R0294

CONDUCTED BY THE NATIONAL RESEARCH COUNCIL WITH THE SUPPORT OF THE NATIONAL SCIENCE FOUNDATION

THE ACCOMPANYING LETTER requests your assistance in this biennial survey of doctoral scientists and engineers – including the fields of the natural and social sciences, mathematics, and engineering.

PLEASE READ the instructions for each question carefully and answer by printing your reply or entering an 'X' in the appropriate box.

PLEASE CHECK the pre-printed information to be certain that it is correct and complete.

PLEASE RETURN the completed form in the enclosed envelope to the Commission on Human Resources, JH 638, National Research Council, 2101 Constitution Avenue, N.W., Washington, D.C. 20418.

NOTE: ALL INFORMATION YOU PROVIDE WILL BE TREATED AS CONFIDENTIAL AND USED IN GROUP COMPARISONS FOR RESEARCH PURPOSES ONLY.

_____

_____

_____ (10)

If your name and address are incorrect, please enter correct information on the lines provided above. Include ZIP CODE.

If there is an alternate address through which you can always be reached, please provide it on the line below.

_____

C/O Number Street City State ZIP CODE (11)

1. Date of Birth Mo. Day Year (12-16)	2. State or Foreign Country of Birth (17-18)	3. Citizenship (19) USA 0☐ Non-USA, specify country 1☐ _____ (20-21)	4. Sex (22) 1☐ Male 2☐ Female

5. Racial/Ethnic Identification (23)

0☐ White/Caucasian
1☐ Black/Negro/Afro-American
2☐ American Indian
3☐ Mexican-American/Chicano
4☐ Puerto Rican-American
5☐ Oriental
6☐ Other Asian
7☐ Other, specify _____

6. List in the table below all collegiate and graduate degrees, excluding honorary degrees, that have been awarded to you. Please check the pre-printed information, including the number and name of the specialty from the list on page 3, to be certain that it is correct and complete.

Type of Degree	Granted Mo. Yr.	Major Field (Use Specialties List) Name Number	Institution Name	City (or campus) & State
Bachelor's				
Master's				
Doctorate				
Other, Specify				

PLEASE NOTE that in items 7-10 information is requested for both the current year, as of the week of February 9-15, 1975, and last year, as of the week of February 10-16, 1974.

7. What was your employment status as of the periods indicated?
(Check only one category in each year.)

	1974	1975
Employed full-time, science or engineering related position	☐ 1	☐
Employed full-time, nonscience or nonengineering related position	☐ 2	☐
Employed part-time, science or engineering related position	☐ 3	☐
Employed part-time, nonscience or nonengineering related position	☐ 4	☐
Postdoctoral appointment (fellowship, traineeship, research associateship, etc.)	☐ 5	☐
Unemployed and seeking employment	☐ 6	☐
Specify number of months unemployed: _____ (66-67)		
Unemployed and not seeking employment	☐ 7	☐
Retired and not employed	☐ 8	☐
Specify year of retirement: _____ (68-69)		
Other, specify: _____	☐ 9	☐
	(64)	(65)

7a. If you were employed full-time during February 9-15, 1975, in a position unrelated to science or engineering, what was the MOST important reason for taking the position?

	1975
Prefer nonscience or nonengineering position	☐ 1
Promoted out of science or engineering position	☐ 2
Pay is better	☐ 3
Locational preference	☐ 4
Science or engineering position not available	☐ 5
Other, specify: _____	☐ 6
	(70)

7b. If you were employed part-time during February 9-15, 1975, were you seeking full-time employment? 1☐ Yes 2☐ No (71)

Please do not write in this space

1 1 2-9 ctr # C
10 11

12 13 14 15 16
17 18 19 20 21
22 23

B
24 25 26
27 28 29
30 31 32 33 34 35

M
36 37 38
39 40 41
42 43 44 45 46 47

D
48 49 50
51 52 53
54 55 56 57 58 59

O
60 61 62 63
64 65
66 67 68 69
70 71

8. Which category below best describes the type of organization of your principal employment OR postdoctoral appointment?

(Check only one category in each year.)

	1974	1975
Business or industry	☐ 1	☐
Junior college, 2-year college, technical institute	☐ 2	☐
Medical school	☐ 3	☐
4-year college or university, other than medical school	☐ 4	☐
Elementary or secondary school system	☐ 5	☐
Hospital or clinic	☐ 6	☐
U.S. military service, active duty, or Commissioned Corps, e.g., USPHS, NOAA	☐ 7	☐
U.S. government, civilian employee	☐ 8	☐
State government	☐ 9	☐
Local or other government, specify: _____	☐ 10	☐
International Agency	☐ 11	☐
Non-profit organization, other than hospital, clinic, or educational institution	☐ 12	☐
Other, specify: _____	☐ 13	☐
	(72-73)	(74-75)

9. What were the primary (A) and secondary (B) work activities related to your position?

(Check only one box in each column.)

	1974 A	1974 B		1975 A	1975 B
Management or administration of:					
Research and development	☐	☐	1	☐	☐
Other than research and development	☐	☐	2	☐	☐
Both	☐	☐	3	☐	☐
Basic research	☐	☐	4	☐	☐
Applied research	☐	☐	5	☐	☐
Development of equipment, products, systems, data	☐	☐	6	☐	☐
Design	☐	☐	7	☐	☐
Teaching	☐	☐	8	☐	☐
Report or other technical writing, editing	☐	☐	9	☐	☐
Production	☐	☐	10	☐	☐
Consulting, specify: _____	☐	☐	11	☐	☐
Professional services to individuals	☐	☐	12	☐	☐
Quality control, inspection, testing	☐	☐	13	☐	☐
Sales, marketing, purchasing, estimating	☐	☐	14	☐	☐
Other, specify: _____	☐	☐	15	☐	☐
	(10-13)			(14-17)	

72 73 74 75

2 / 1 2-9 ctr #

10 11 12 13

14 15 16 17

10. From the Degree and Employment Specialties List on page 4, select and enter both the number and title of the scientific specialty most closely related to your principal employment or postdoctoral appointment. Write in your specialty if it is not on the list.

1974 _____ (18-20)
Number Title of Specialty

1975 _____ (21-23)
Number Title of Specialty

18 19 20

21 22 23

Please answer items 11 through 13 regarding your employment during the week of February 9-15, 1975.

11. What percent of time did you devote to each of the following activities?

	%	
Management or administration of:		
Research and development	_____	(24)
Other than research and development	_____	(26)
Both	_____	(28)
Basic research	_____	(30)
Applied research	_____	(32)
Development	_____	(34)
Design	_____	(36)
Teaching	_____	(38)
Consulting	_____	(40)
Other, specify: _____	_____	(42)
TOT L	100%	

12. Please give the name of your principal employer (organization, company, etc., or, if self-employed, write "self"), and actual place of employment.

_____ (44-49)
Name of Employer

_____
Number Street

_____
City State ZIP Code (50-54)

24 25 26 27 28 29

30 31 32 33 34 35

36 37 38 39 40 41

42 43

44 45 46 47 48 49

50 51 52 53 54

13. What was the basic annual salary* associated with your principal professional employment during the week of February 9-15, 1975? If you were on a postdoctoral appointment (e.g., fellowship, traineeship, research associateship), what was your annual stipend plus allowances?

$_____ per year (55-57)

55 56 57

***NOTE:** Basic annual salary is your annual salary before deductions for income tax, social security, retirement, etc., but does not include bonuses, overtime, summer teaching, or other payment for professional work.

If academically employed:

a. Check whether salary was for ☐ 9-10 months or ☐ 11-12 months. (58)

58

b. Did you hold a tenured position during February 9-15, 1975? 0 ☐ Yes 1 ☐ No. (59) **If yes, what year was the tenure granted?** _____ (60-61)

59 60 61

c. What is the rank of your position?

1 ☐ Professor	4 ☐ Instructor	7 ☐ President or Chancellor
2 ☐ Associate Professor	5 ☐ Lecturer	8 ☐ Other, specify: _____
3 ☐ Assistant Professor	6 ☐ Dean	9 ☐ Does not apply (62)

62

14. How many years of professional work experience, including teaching, have you had? _____Year(s) (63-64)

63 64

15. Have you ever held a postdoctoral appointment? 0 ☐ Yes 1 ☐ No (65)

65

If yes, list below the time periods of your most recent postdoctoral appointments.

Appointment	Starting Year	Total Months
Most Recent	_____ (66-67)	_____ (68-69)
Second Most Recent	_____ (70-71)	_____ (72-73)
Third Most Recent	_____ (74-75)	_____ (76-77)

66 67 68 69

70 71 72 73

74 75 76 77

How many other postdoctoral appointments have you held? _____ (78)

78

16. Have you ever been a full-time employee (excluding summer employment) of business or industry since earning your doctorate?

0 ☐ Yes 1 ☐ No (10)

If yes,

a. For how many years?

_____Year(s) (11-12)

b. If you were employed by business or industry in February, 1975, check here ☐. If not, how many years ago did you leave your most recent business or industry employment?

_____Year(s) (14-15)

17. Have you ever been a full-time employee (excluding summer employment) of an academic institution or organization since earning your doctorate?

0 ☐ Yes 1 ☐ No (16)

If yes,

a. For how many years?

_____Year(s) (17-18)

b. If you were employed by an academic institution or organization in February, 1975, please check here ☐. If not, how many years ago did you leave your most recent academic employment?

_____Year(s) (20-21)

18. Have you ever been a full-time employee (excluding summer employment) of government (federal, state, or local) since earning your doctorate?

0 ☐ Yes 1 ☐ No (22)

If yes,

a. For how many years?

_____Year(s) (23-24)

b. If you were employed by government in February, 1975, check here ☐. If not, how many years ago did you leave your most recent government employment?

_____Year(s) (26-27)

3
1 2-9 ctr #

10 11 12

13 14 15

16 17 18

19 20 21

22 23 24

25 26 27

---

19. Listed below are selected topics of critical national interest. If you devoted a significant proportion of your professional time to any of these problem areas in February, 1975, please check the box for the one on which you spent the MOST time.

Education:
1 ☐ Teaching
2 ☐ Other
3 ☐ Health
4 ☐ Defense
5 ☐ Environmental protection, pollution control
6 ☐ Space
7 ☐ Crime prevention and control
8 ☐ Food production and technology
9 ☐ Energy and fuel
10 ☐ Other mineral resources
11 ☐ Community development and services
12 ☐ Housing (planning, design, construction)
13 ☐ Transportation, communications
14 ☐ Other, specify: _____

(28-29)

28 29

---

20. Was any of your work in February, 1975, supported or sponsored by U.S. Government funds?

0 ☐ Yes 1 ☐ No 2 ☐ Don't know (30)

30

If yes, which of the following federal agencies or departments were supporting the work? (Check all that apply.)

31 ☐ NASA
32 ☐ National Science Foundation
33 ☐ Environmental Protection Agency
34 ☐ Energy Research & Development Administration (AEC)
35 ☐ Nuclear Regulatory Commission (AEC)
36 ☐ Agency for International Development
37 ☐ Department of the Interior
38 ☐ National Institutes of Health, HEW
39 ☐ Alcohol, Drug Abuse & Mental Health Administration, HEW
40 ☐ Office of Education, HEW
41 ☐ Other HEW, specify: _____
42 ☐ Department of Defense
43 ☐ Department of Commerce
44 ☐ Department of Agriculture
45 ☐ Department of Transportation
46 ☐ Department of Justice
47 ☐ Department of Housing and Urban Development
48 ☐ Other agency or department, specify: _____
49 ☐ Don't know source agency

31 32 33 34

35 36 37 38

39 40 41 42

43 44 45 46

47 48 49

DEGREE AND EMPLOYMENT SPECIALTIES LIST

MATHEMATICAL SCIENCES

000 - Algebra
010 - Analysis & Functional Analysis
020 - Geometry
030 - Logic
040 - Number Theory
052 - Probability
055 - Math, Statistics (see also 544, 670, 725, 729)
060 - Topology
080 - Computing Theory & Practice
082 - Operations Research (see also 477)
085 - Applied Mathematics
089 - Combinatorics & Finite Mathematics
091 - Physical Mathematics
098 - Mathematics, General
099 - Mathematics, Other*

ASTRONOMY

101 - Astronomy
102 - Astrophysics

PHYSICS

110 - Atomic & Molecular Physics
120 - Electromagnetism
130 - Mechanics
132 - Acoustics
134 - Fluids
135 - Plasma Physics
136 - Optics
138 - Thermal Physics
140 - Elementary Particles
150 - Nuclear Structure
160 - Solid State
198 - Physics, General
199 - Physics, Other*

CHEMISTRY

200 - Analytical
210 - Inorganic
215 - Synthetic Inorganic & Organometallic
220 - Organic
225 - Synthetic Organic & Natural Products
230 - Nuclear
240 - Physical
245 - Quantum
250 - Theoretical
255 - Structural
260 - Agricultural & Food
265 - Thermodynamics & Material Properties
270 - Pharmaceutical
275 - Polymers
280 - Biochemistry (see also 540)
285 - Chemical Dynamics
298 - Chemistry, General
299 - Chemistry, Other*

EARTH, ENVIRONMENTAL & MARINE SCIENCES

301 - Mineralogy, Petrology
305 - Geochemistry
310 - Stratigraphy, Sedimentation
320 - Paleontology
330 - Structural Geology
341 - Geophysics (Solid Earth)
350 - Geomorph., Glacial Geology
360 - Hydrology
370 - Oceanography
381 - Atmospheric Chemistry & Physics
382 - Atmospheric Dynamics
391 - Applied Geology, Geol. Engr., Econ. Geol.
398 - Environmental Sciences, General
399 - Environmental Sciences, Other*
397 - Marine Sciences, Other*
398 - Earth Sciences, General
399 - Earth Sciences, Other*

ENGINEERING

400 - Aeronautical & Astronautical
410 - Agricultural
415 - Biomedical
420 - Civil
430 - Chemical
435 - Ceramic
440 - Electrical
445 - Electronics
450 - Industrial, Manufacturing
455 - Nuclear
460 - Engineering Mechanics
465 - Engineering Physics
470 - Mechanical
475 - Metallurgy & Phys. Met. Engr.
477 - Operations Research, Systems (see also 082)
479 - Fuel Technology, Petrol Engr.
480 - Sanitary/Environmental
486 - Mining
497 - Materials Science Engr.
498 - Engineering, General
499 - Engineering, Other*

AGRICULTURAL SCIENCES

500 - Agronomy
501 - Agricultural Economics
502 - Animal Husbandry
504 - Fish & Wildlife
505 - Forestry
506 - Horticulture
507 - Soils & Soil Science
510 - Animal Sciences
511 - Phytopathology
517 - Food Science & Technology (see also 573)
518 - Agriculture, General
519 - Agriculture, Other*

MEDICAL SCIENCES

520 - Medicine & Surgery
522 - Public Health
523 - Veterinary Medicine
524 - Hospital Administration
527 - Parasitology
534 - Pathology
536 - Pharmacology
537 - Pharmacy
538 - Medical Sciences, General
539 - Medical Sciences, Other*

BIOLOGICAL SCIENCES

540 - Biochemistry (see also 280)
542 - Biophysics
543 - Biomathematics
544 - Biometrics, Biostatistics (see also 055, 670, 725, 729)
545 - Anatomy
546 - Cytology
547 - Embryology
548 - Immunology
550 - Botany
560 - Ecology
562 - Hydrobiology
564 - Microbiology & Bacteriology
566 - Physiology, Animal
567 - Physiology, Plant
569 - Zoology
570 - Genetics
571 - Entomology
572 - Molecular Biology
573 - Food Science & Technology (see also 517)
574 - Behavior/Ethology
578 - Biological Sciences, General
579 - Biological Sciences, Other*

PSYCHOLOGY

600 - Clinical
610 - Counseling & Guidance
620 - Developmental & Gerontological
630 - Educational
635 - School Psychology
641 - Experimental
642 - Comparative
643 - Physiological
650 - Industrial & Personnel
660 - Personality
670 - Psychometrics (see also 055, 544, 725, 729)
680 - Social
698 - Psychology, General
699 - Psychology, Other*

SOCIAL SCIENCES

700 - Anthropology
703 - Archeology
708 - Communications*
709 - Linguistics
710 - Sociology
720 - Economics (see also 501)
725 - Econometrics (see also 055, 544, 670, 729)
729 - Social Statistics (see also 055, 544, 670, 725)
740 - Geography
745 - Area Studies*
750 - Political Science, Public Administration
755 - International Relations
770 - Urban & Reg. Planning
775 - History & Phil. of Science
798 - Social Sciences, General
799 - Social Sciences, Other*

ARTS & HUMANITIES

841 - Fine & Applied Arts (including Music, Speech, Drama, etc.)
842 - History
843 - Philosophy, Religion, Theology
845 - Languages & Literature
846 - Other Arts and Humanities*

EDUCATION & OTHER PROFESSIONAL FIELDS

938 - Education

882 - Business Administration
883 - Home Economics
884 - Journalism
885 - Speech and Hearing Sciences
886 - Law, Jurisprudence
887 - Social Work
891 - Library & Archival Science
898 - Professional Field, Other*

899 OTHER FIELDS*

*Identify the specific field in the space provided on the questionnaire

APPENDIX C

SAMPLING ERROR

Statistics gathered for this study were obtained from a stratified random sample; estimates of population values are thus subject to sampling error. To aid in the evaluation of the data sampling errors were calculated for all statistics cited in the analytical text of the report. Variances were computed using the formula for a stratified random sample:

$$\sigma_p = \left[\frac{1}{N^2} \cdot \sum_h N_h^2 \cdot \frac{(N_h - n_h)}{(N_h - 1)} \cdot \frac{p_h(1-p_h)}{n_h} \right]^{\frac{1}{2}}$$

In the formula, N denotes the size of the population, N_h the stratum population, n_h the stratum sample, and p_h the estimated proportion of the population of stratum h with a particular attribute, y (e.g., unemployed and seeking work):

$$p_h = \frac{\sum_i y_{hi}}{n_h}$$

In this report, many of the estimates are proportions whose base is the estimated labor force or other subgroup in a specified variable-designated category (e.g., female physics/astronomy Ph.D.'s). Such estimates are thus ratios of random variables (y/x), i.e., estimates based on the sample. The formula given above for σ_p is not strictly applicable to these estimates. Operational and time constraints precluded the computation of the more complex formula for the sampling error appropriate to ratio estimates. However, a useful approximation is provided by the formula for σ_p by omitting the finite population correction factor $(N_h - n_h)/(N_h - 1)$ and re-interpreting p_h to denote the estimated proportion of the specified variable-designated category that has a given characteristic, y; N to denote the population (and N_h the stratum population) number in the specified category; and n_h to denote the stratum sample size in the specified category.

APPENDIX D

LABOR FORCE ESTIMATES OF

DOCTORAL SCIENTISTS AND ENGINEERS

ESTIMATES FOR FIGURE 1

Age (In Year of Survey)		Sex: Male and Female	Age (In Year of Survey)		Sex: Male and Female
29 or under	1973	10,393	50-54	1973	24,596
	1975	9,848		1975	29,491
30-34	1973	52,198	55-59	1973	15,909
	1975	57,099		1975	18,863
35-39	1973	44,144	60-64	1973	8,907
	1975	55,628		1975	11,493
40-44	1973	36,742	65 or over	1973	5,394
	1975	41,729		1975	6,156
45-49	1973	30,790			
	1975	34,948			

ESTIMATES FOR FIGURE 3

Calendar Year of Ph.D.		Sex: Male	Female
1930-1939	1973	6,957	526
	1975	5,666	491
1940-1949	1973	15,261	1,123
	1975	14,793	1,136
1950-1959	1973	49,148	3,370
	1975	49,643	3,362
1960-1964	1973	36,681	2,705
	1975	37,474	2,782
1965-1969	1973	62,558	5,581
	1975	63,238	5,632
1970-1972	1973	40,667	4,737
	1975	49,052	5,897
1973-1974	1975	22,382	3,877

ESTIMATES FOR FIGURES 6, 7, AND 9

Primary Work Activity		Type of Employer: Business/ Industry	Type of Employer: Educational Institutions	Field of Ph.D.: All Fields
Management/ Administration	1973	17,300	11,383	40,410
	1975	23,078	15,839	52,890
Research/Development/Design	1973	23,158	28,198	69,510
	1975	29,393	36,760	84,660
Teaching	1973	*	80,133	81,730
	1975	*	93,008	93,850
Report, Technical Writing/ Consulting	1973	2,583	772	5,212
	1975	4,606	858	7,353
Production/Quality Control/Sales/ Professional Services	1973	2,398	1,926	9,639
	1975	5,838	2,678	13,742
Other	1973	1,351	1,461	4,349
	1975	1,720	924	4,175

*Included in "Other" Category